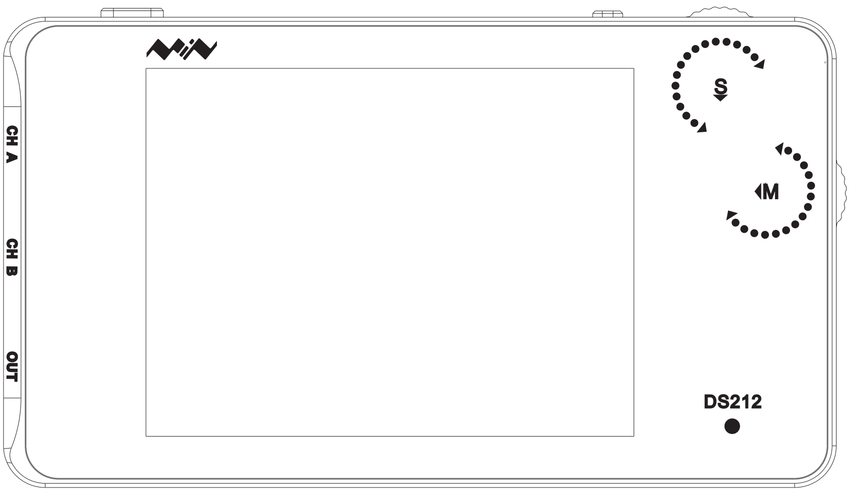
DS212 Mini Oscilloscope

User Manual

Version 1.0



Contents

This user manual is based on APP V1.03

Warning: Warning statements identify conditions or practices that could result in injure yourself or others.

Caution: Caution statements identify conditions or practices that could result in damage to your device or other property.

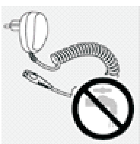
Attention: Attention statements identify annotations, usage tips or additional information.

Safety Statement

General Safety Information

- Read carefully all the following safety precautions to avoid personal injury and prevent damage to the device or any products connected to it. Failure to follow these safety instructions could result in personal injuries or risk of fire.

- **Use proper power cord.** Please use power cord specified for this product and certified for your country/district of use.
- **Connect and disconnect properly.** Do not connect or disconnect probe or test leads while they are connected to voltage source. Before you connect or disconnect current probes,please disconnect power to the circuit under test.
- **Observe all the terminal ratings.** To avoid fire or shock hazard, please do not measure signals at DC40V or above. Please read the User Manual carefully to learn more about ratings before connection.



- Do not operate in a humid environment.
- Do not operate in a potentially inflammable/explosive atmosphere.
- Please keep the device surface clean and dry.

Operating Environment

Operating Environment	Requirement	
Temperature	Operating Condition:	+0°C to 50°c
	Non-operating Condition:	-20°c to +60°c
Humidity	Operating Condition:	High Temperature：40°C to 50°C,0% to 90%RH
		Low Temperature : 0° C to 40°C,10% to 90%RH
	Non-operating Condition:	High temperature : 40°C to 60°C,5% to 95%RH
		Low temperature : 0° C to 40°C,5% to 95%RH

Chapter 1

DS212 Overview

Specifications

Performance parameters

Coupling	AC/DC
Analog bandwidth	1MHz
Maximum sampling rate	10MSa/s
Analog input impedance	1MΩ
Maximum input voltage	±40V(X1 probe)
Maximum sample memory depth	8K
Horizontal sensitivity	1uS/Div~2S/Div(in 1-2-5 sequence step)
Vertical sensitivity	20mv/Div~10V/Div (in 1-2-5 sequence step)



Functionalities

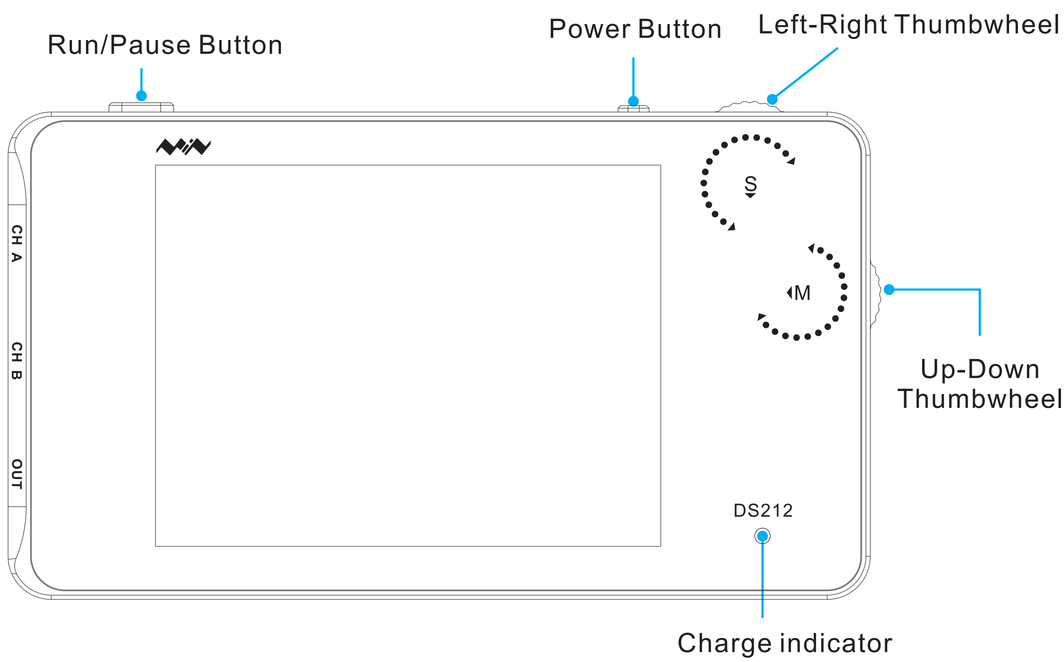
Modes	Vertical precise, horizontal precise measurement andtrigger threshold
Trigger mode	Rising/Falling edge trigger
Synchronous mode	Auto, Normal, Single, None, Scan
Auto measurement	frequency, cycle time, duty cycle,DC RMS voltage/ Vpp /Vmax/Vmin/Vavg
Inbuilt signal Generator	10Hz~1MHz square wave (duty adjustable) or 10Hz~20KHz Sine/ Square/Triangle/Sawtooth wave

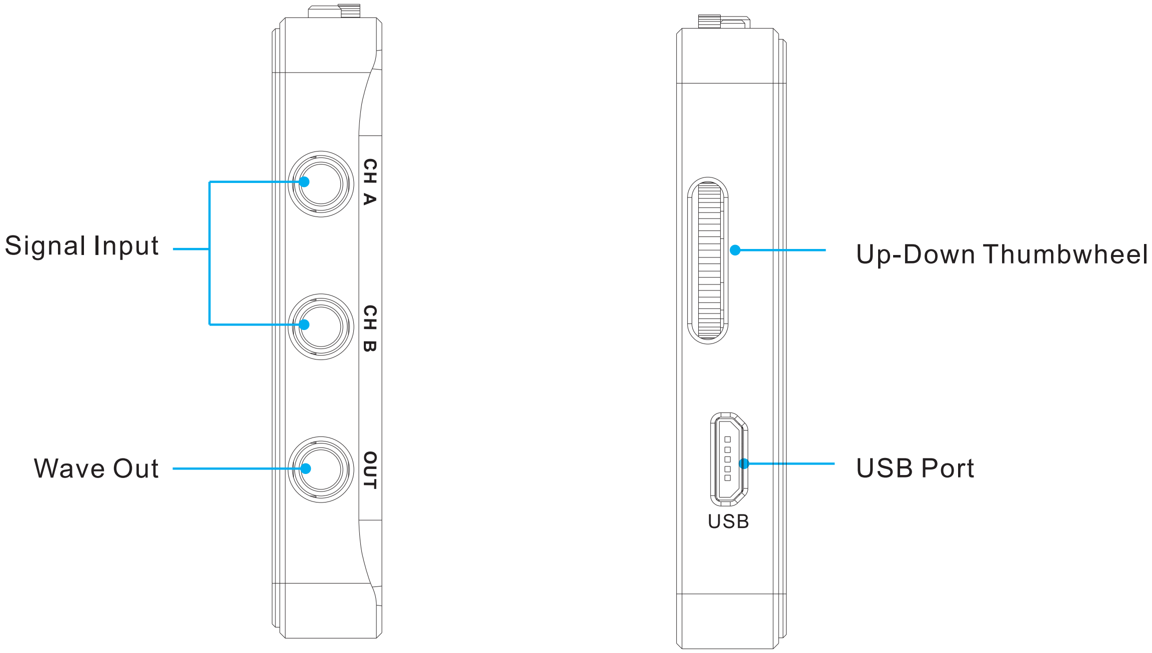
Product parameters

Storage	Inbuilt 8MB U disk storage for waveform data and images
Dimension	(100mm×56.5mm×10mm)
Battery	Internal 500mAh Lithium battery, external USB port
Display	Color TFT LCD display (320X240 pixels)

DS212 Overview

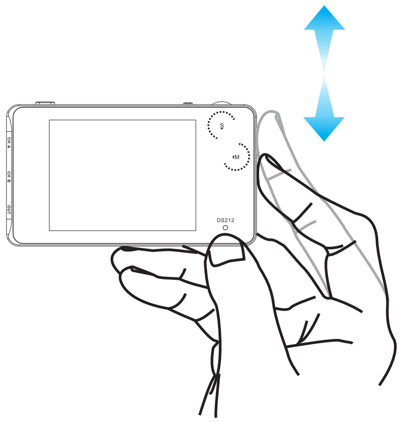
Interface & Buttons



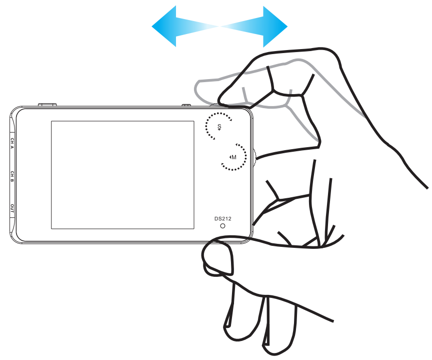


DS212 Overview

Operation on option area



Dial Up/Down



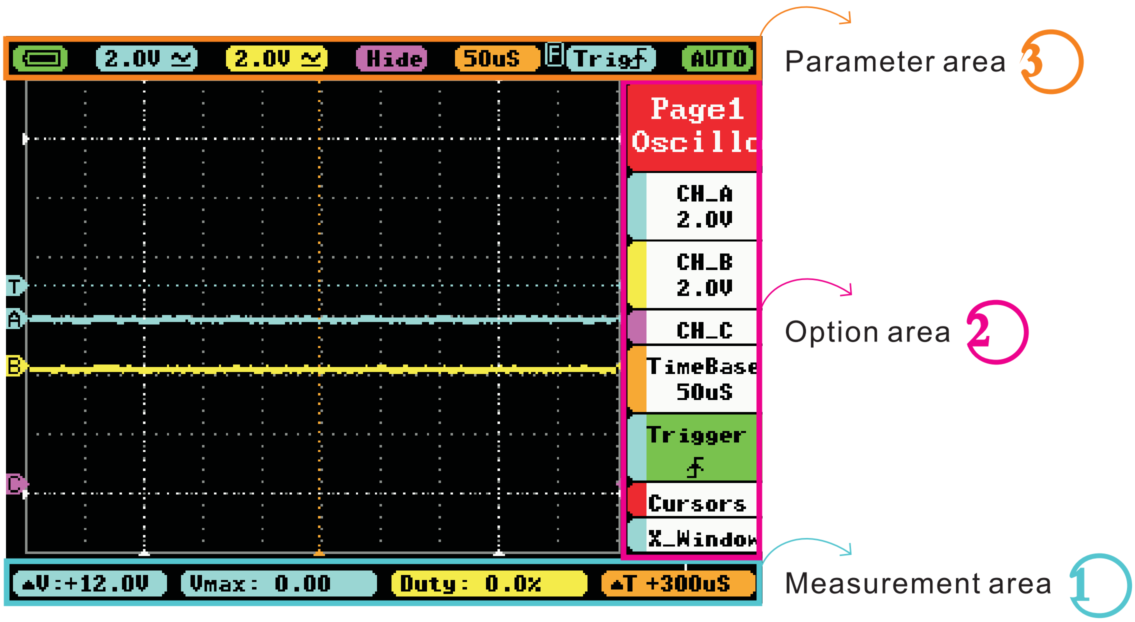
Dial Left/Right

Button	Function
▶||	1)Click:Run/Pause 2)long press:Save current parameter/screen display
Wheel M	(Dial Up/Down) Choose up/down
Wheel M middle button	1)Click:Sub-menu On/Off 2)long press:Enter file management 3)Double click:When "Auto Fit" is ON, auto adjustment
Wheel S	Dial left/right to increase/decrease the setting parameters
Wheel S middle button	1)Click:Switch Menu/Confirm sub-menu 2)long press:Menu display/hide

Note that each item's color in Parameter Area is the same as that in Measurement Area.

Interface Introduction

Home screen introduction



Home screen

1 Measurement area introduction



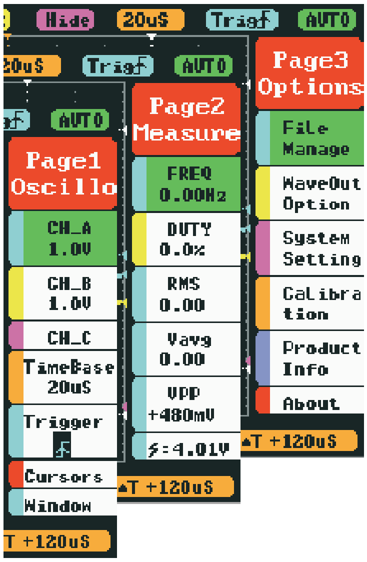
Menu	Function
▲V:+6.00V	△V=V1-V2
Freq: 0.00Hz	Measured Value（Blue corresponds with Channel A, Yellow with Channel B） corresponding the 1st and 2nd item in Page2
Duty: 0.0%	
▲T +120uS	△T=T2-T1

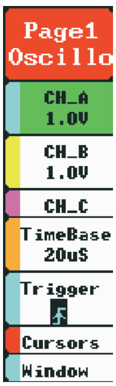
Interface Introduction

Home screen introduction

2

Option area introduction





Page1(oscilloscope)

A channel option

Bchannel option

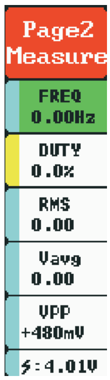
C channel option

TimeBase option

Trigger option

Vernier option

Horizontal window



Page2(Measurement)

Frequency

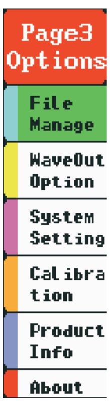
Duty ratio

root-mean-square value

voltage average value

voltage peak-to-peak value

battery voltage



Page3(option)

File management

Output option

System settings

Adjusting option

Product information

relevant information

Annotation: detailed introduction to options refer to Page 13-19

Chapter 2

Interface Introduction

Home screen introduction

3 Parameter area introduction



Menu	Item	Functions
(battery icon)	(battery) / (USB) / (USB)	Battery supply/USB charging/Full charge
1.0V	20mV—10V(1-2-5 sequence step) AC/DC	(Channel A) y-axis voltage per grid, AC/ DC coupling method
1.0V	20mV—10V(1-2-5 sequence step) AC/DC	(Channel B) y-axis voltage per grid, AC/ DC coupling
Hide	(-A)/(-B)/(A+B)/(A-B)/ RecA/RecB/RecC/Hide	(-A):Ch_A waveform reverses (-B): Ch_B waveform reverses (A+B): Ch_A waveform overlaps with Ch_B waveform; (A-B):Subtraction of channel A waveform and channel B waveform RecA:Reload the last waveform saved in Ch_A; RecB:Reload the last waveform saved in Ch_B RecC:Reload the last waveform saved in Ch_C Hide:Hide waveform
20uS	1.0uS—1S(1-2-5sequence step)	Timebase (x-axis voltage per grid)
Trig	(falling edge) (rising edge)	Trigger mode: falling edge trigger/ rising edge trigger
AUTO	AUTO/NORM/SINGL/ NONE/SCAN/STOP	Auto/Normal/Single/Slow Scan/ Instant Scan/Run/Pause

Getting Started

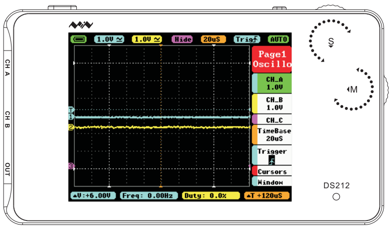
Power On/Off



●"OFF"Power On/Off Button

●Switch power button to "OFF" to turn off DS212
(If DS212 was powered off automatically, switch off the power button before turning on.)

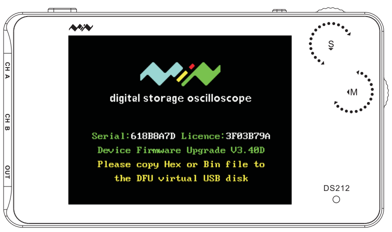
Turn on/off



●Normally, turn on DS212, it enters APP1 by default.

●Hold Wheel S and turn on DS212, it enters APP2 (If APP2 is not installed, it enters DFU mode.)

Switch APP



●Hold Pause button “ ▶II ”and turn on DS212, to enter DFU mode.

Upgrade mode

Chapter 3

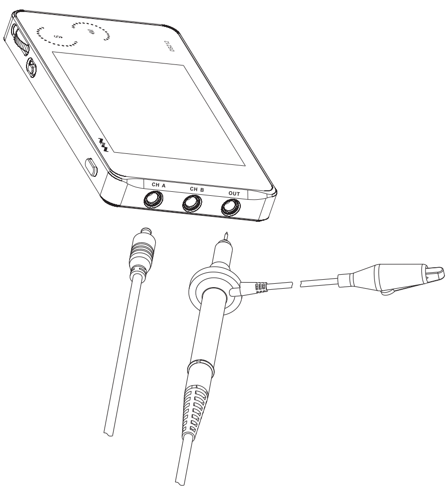
Getting Started

Check up before use

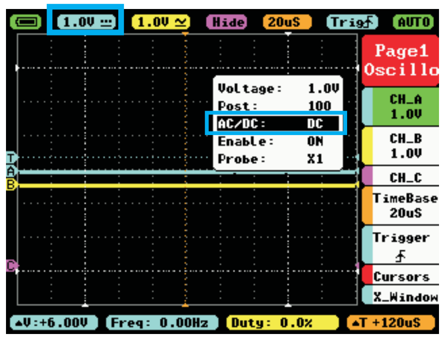
Make a quick inspection of functions to ensure the device is working soundly. Please perform following steps:

- Turn on power and access the homepage of the mini oscilloscope.
- Place in the standard signal (e.g. square wave 1 KHz, Vpp=3V), insert X1 probe's MCX end to CH A or CH B, and the probe to "OUT". Check if the measurement value and the standard value are equal, calibrate if different.

See below for detailed instructions:

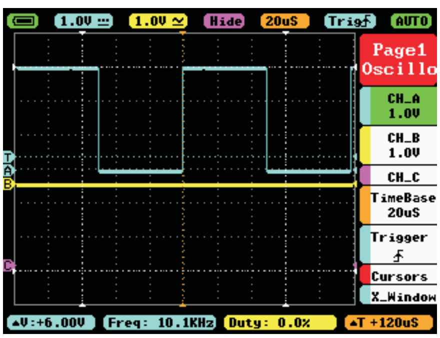


Connect probes to both the MCX and CH A input jacks



Adjust relevant parameters of CH A:

1. Adjust the DC mode in AC/DC function in CH A
2. Voltage adjustment:Switch Voltage to 1V

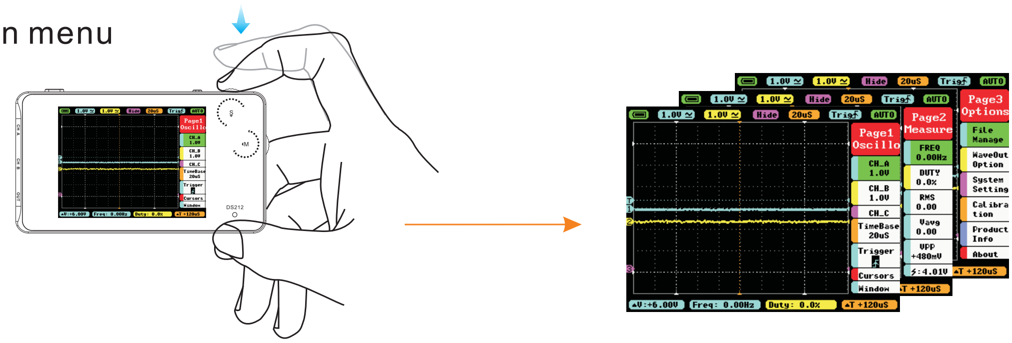


Measure WAVE OUT outlet waveform

Getting Started

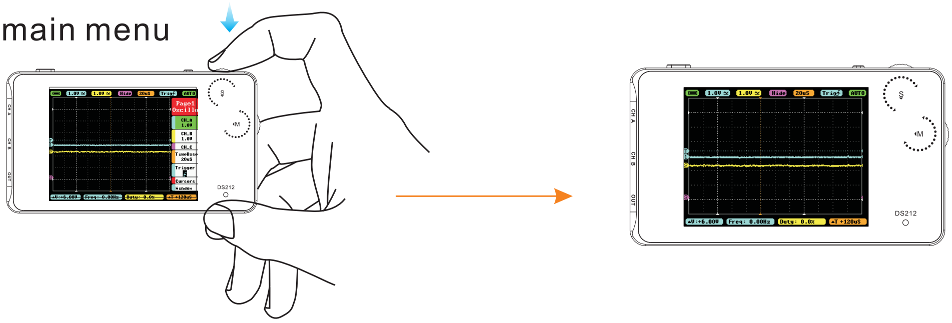
Operation Introduction

Switch main menu



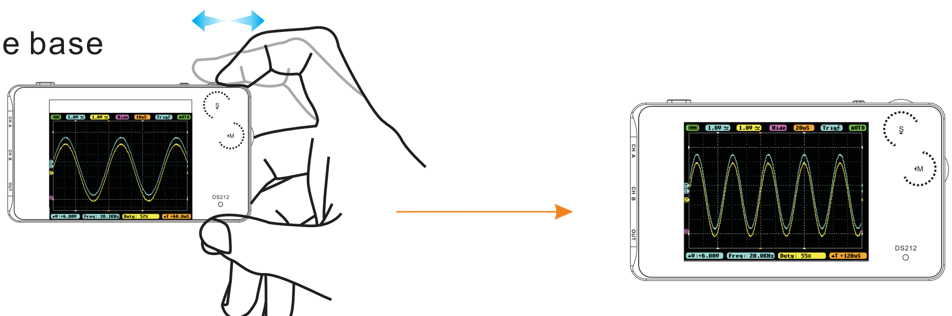
In main menu, middle click Wheel S to switch main menu

Show/Hide main menu



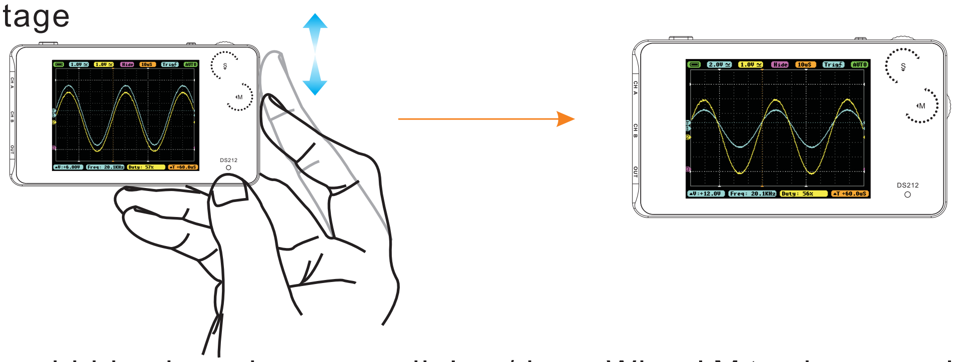
In main menu, hold Wheel S middle button to show/hide main menu

Change time base



When hidden in main menu,dial left/right Wheel S to change time base
(middle click Wheel S to switch current trigger channel)

Change voltage



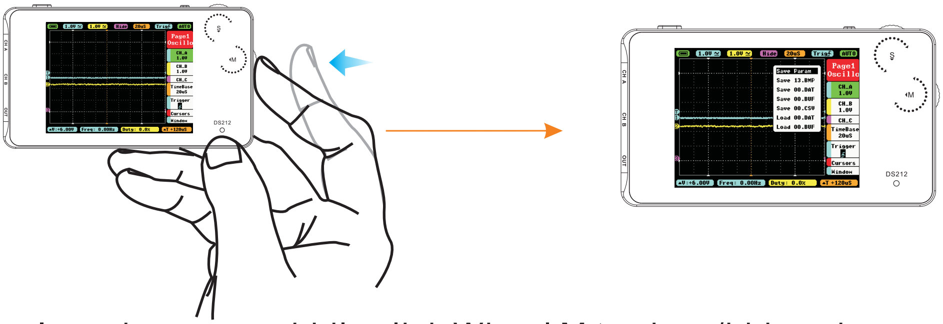
When hidden in main menu, dial up/down Wheel M to change voltage
(middle click Wheel M to switch Channel A/B)

Chapter 3

Getting Started

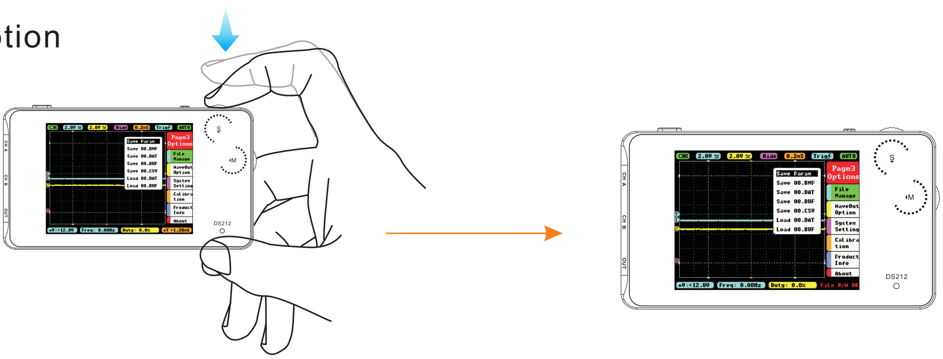
Operation Introduction

Show/Hide sub-menu



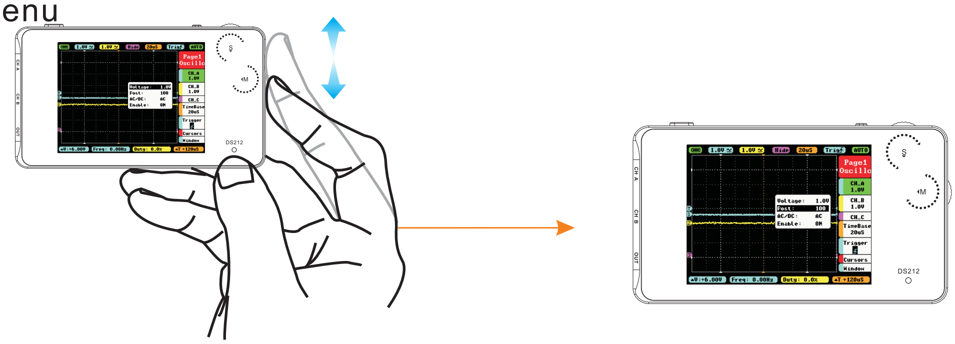
In main menu, middle click Wheel M to show/hide sub-menu

Confirm option



In sub-menu, middle click Wheel S to confirm operation

Choose menu

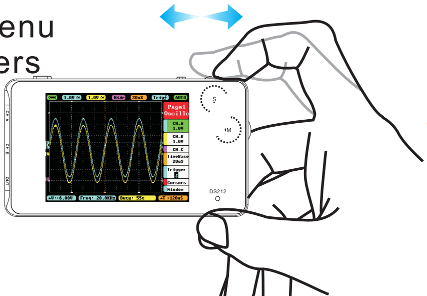


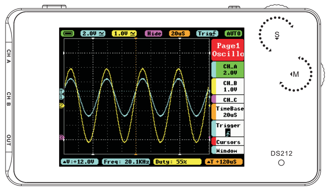
In main menu/sub-menu, dial up/down Wheel M to choose up/down menu options

Getting Started

Operation Introduction

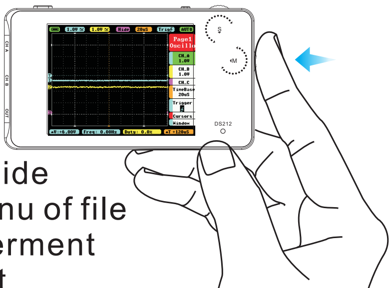
Adjust menu parameters

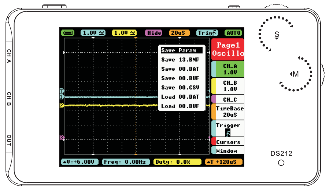




In main menu/sub-menu, dial left/right Wheel S to increase/decrease the setting parameters.(When adjusting parameters of "Post" in sub-menu, hold Wheel S middle button can fast adjust readings)

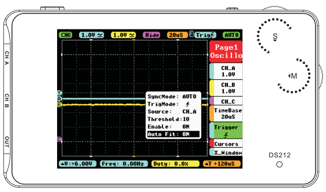
Show/Hide sub-menu of file managerment shortcut

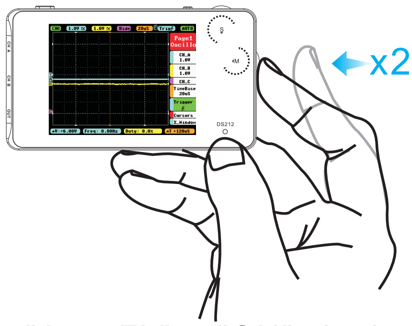




In main menu/sub-menu, hold Wheel M middle button to show/hide sub-menu of file managerment

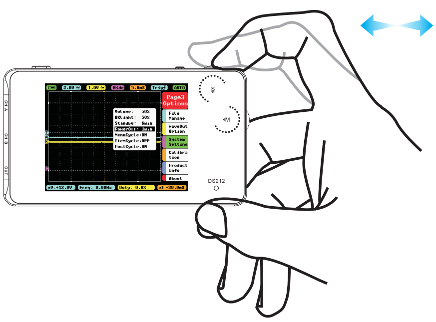
"Auto Fit" setting





Enter "Trigger" in "Page 1" of main menu, set "Auto Fit" to "ON", double click Wheel M middle button, DS212 will automcatically calibrate amplitude, time base and trigger.

Auto-off setting



Enter "system setting" of "Page 3" under main menu, choose "Power off", and dial Wheel S left/right to choose the time setting of auto power off. If charging via USB, auto power off will not be activated.

Functional Overview

Overview of Menu options

DS212 Menu

- **Page1 Oscillo**
  - **CH_A**
    - Voltage
    - Post
    - AC/DC
    - Enable
    - Probe
  - **CH_B**
    - Same With CH_A
  - **CH_C**
    - Math
    - Post
    - Enable
  - **TimeBase**
    - 1.0uS - 2.0S
    - 1-2-5
  - **Trigger**
    - SyncMode
    - TrigMode
    - Source
    - Threshold
    - Enable
    - Auto Fit
  - **Cursors**
    - T1 Post
    - T2 Post
    - Enable T
    - V1 Post
    - V2 Post
    - Enable V
  - **X_Window**
    - Post
    - Depth
    - Enable
- **Page2 Measure**
  - **Freq**
    - Source
    - Type
    - Enable
  - **Duty**
    - Source
    - Type
    - Enable
  - **RMS**
    - Source
    - Type
    - Enable
  - **Vavg**
    - Source
    - Type
    - Enable
  - **Vpp**
    - Source
    - Type
    - Enable
  - **Vbat**
    - Battery voltage
- **Page3 Options**
  - **File Manage**
    - Save Param
    - Save Bmp
    - Save Dat
    - Save Buf
    - Save Csv
    - Load Dat
    - Load Buf
    - Save Svg
  - **WaveOut Option**
    - Type
    - Freq
    - Duty
  - **System Setting**
    - Volume
    - BKlight
    - Standby
    - Power Off
    - Menu Cycle
    - Item Cycle
    - Post Cycle
  - **Calibration**
    - Calibrate Zero
    - Restore Data
  - **Product Info**
    - Device SN
    - Hardware
    - MCU Type
    - LCD Type
    - USB Disk
    - DFU Type
    - APP Type
  - **About**

Chapter 4

Functional Overview

Specific Parameter Intro

Menu	Options	Functions	Annotation for Functions	Description
Page1 Oscillo Page1 Oscillo	CH_A 1.0V	Voltage	Channel A y-axis voltage per grid	20mV/50mV/0.1V/0.2V/0.5V/ 1.0V/2.0V/5.0V/10V
		Post	Adjust Channel A waveform position upward/downward in the window	Position:5-195
		AC/DC	channel A coupling	AD/DC
		Enable	channel A display/hide	ON/OFF
		Probe		X1 / X10
	CH_B 1.0V	Voltage	Channel B y-axis voltage per grid	20mV/50mV/0.1V/0.2V/0.5 V/1.0V/2.0V/5.0V/10V
		Post	Adjust Channel B waveform position upward/downward in the window	Position : 5-195
		AC/DC	channel B coupling	AD/DC
		Enable	channel B display/hide	ON/OFF
		Probe		X1 / X10
	CH_C	Match	Calculation between CH_A waveform and CH_B waveform	–A,-B,A+B,A-B, RecA,RecB,RecC
		Post	Adjust CH_C waveform position upward/downward in the window	Position:5-195
		Enable	CH_C display / hide	ON/OFF
	TimeBase 20uS	TimeBase	TimeBase X-axis voltage per grid	1.0us-2.0s(1-2-5 sequence step)

Functional Overview

Specific Parameter Intro

Menu	Options	Functions	Annotation for Functions	Description
Page1 Oscillo (Page1 Oscillo)	Trigger	Syncmode	Syncmode trigger mode selection	AUTO/NORM/SINGL/ NONE/SCAN Automatic /standard / single pass /slow scan/ immediate scan
		Trigmode	Choose the Triggering Mode	Rising edge/Falling edge Triggering mode
		Source	Choose the Triggering channel	CH A/CH B
		Threshol	Horizontal Triggering Position Level	Position:-80-110
		Enable	Display/Hide Horizontal Triggering Position Level	ON/OFF
		Auto Fit	Automatic adjustment	ON/OFF
	Cursors	T1.Post	Time measurement cursorT1	Position : 5-248
		T2.Post	Time measurement cursor T2	Position:5-248
		Enable.T	Display/Hide Time Measurement cursor	ON/OFF
		V1.Post	Voltage Measurement Cursor V1	Site selection : 2-198
		V2.Post	Voltage Measurement Cursor V2	Site selection:2-198
		Enable.V	Display/Hide Voltage Measurement cursor	CH A/CH B/OFF

Specific Parameter Intro

Menu	Item	Options	Annotation for Functions	Description
Page1 Oscillo (Page1 Oscillo)	Window	Post	Horizontal movement to view waveform	Depends sample memory depth
		Depth	Internal storage depth	1k/2k/4k/8k
		Enable	Display/hide Trigger line cursor	ON/OFF
Page2 Measure (Page2 Measure)	FREQ 0.00Hz	Source	Choose the Measurement channel	CH A/CH B
		Type	Choose the Measurement Type	FREQ/DUTY/ RMS/ Vavg/Vpp/Max/Min
				Notes: Frequency/Duty/ Root Mean Square/ Voltage Avergage/ Voltage Peak-Peak/ Voltage Maximum/ Voltage Minimum
		Enable	Display/Hide measurement window	ON/OFF
	DUTY 0.0%	Source	Choose the Measurement channel	CH A/CH B
		Type	Choose the Measurement Type	FREQ/DUTY/RMS/ Vavg/Vpp/Vmax/ Vmin
				Notes: Frequency/Duty/ Root Mean Square/ Voltage Avergage/ Voltage Peak-Peak/ Voltage Maximum/ Voltage Minimum
		Enable	Display/Hide measurement window	ON/OFF

Specific Parameter Intro

Menu	Options	Functions	Annotation for Functions	Description
Page2 Measure (Page2 Measure)	RMS 0.00	Source	Choose the Measurement channel	CH A/CH B
		Type	Choose the Measurement Type	FREQ/DUTY/RMS/ Vavg/Vpp/Max/Min
				Notes: Frequency/Duty/ Root Mean Square/ Voltage Avergage/ Voltage Peak-Peak/ Voltage Maximum/ Voltage Minimum
		Enable	Display/Hide measurement window	ON/OFF
	Vavg 0.00	Source	Choose the Measurement channel	CH A/CH B
		Type	Choose the Measurement Type	FREQ/DUTY/RMS/ Vavg/Vpp/Max/Min
				Notes: Frequency/Duty/ Root Mean Square/ Voltage Avergage/ Voltage Peak-Peak/ Voltage Maximum/ Voltage Minimum
		Enable	Display/Hide measurement window	ON/OFF
	VPP +480mV	Source	Choose the Measurement Type	CH A/CH B
		Type	Choose the Measurement Type	FREQ/DUTY/RMS/ Vavg/Vpp/Max/Min
				Notes: Frequency/Duty/ Root Mean Square/ Voltage Avergage/ Voltage Peak-Peak/ Voltage Maximum/ Voltage Minimum
		Enable	Display/Hide measurement window	ON/OFF
	ϟ:4.01V	Vbat	Battery voltage	

Specific Parameter Intro

Menu	Options	Functions	Annotation for Functions	Description
Page3 Setting Page3 Options	File Manage	Save Param	Save current parameter settings	Middle click Wheel S to save
		Save Bmp	Save bmp file (waveform image) to the built-in U disk.(Shortcut: long press"Run/Pause"button	Middle click Wheel S to save
		Save Dat	Save dat file to built-in U disk	Middle click Wheel S to save
		Save Buf	Save buf file (sampling data in buffering area) to built-in U disk	Middle click Wheel S to save
		Save Csv	Save csv file (export sampling data in buffering area) to built-in U disk	Middle click Wheel S to save
		Load Dat	Load dat file	Middle click Wheel S to save
		Load Buf	Load buf file	Middle click Wheel S to save
		Save Svg	Save Svg file (sampling buffer figure)	In U disc
	WaveOut Option	Type	Output signal type	squar/sine/triangle /sawtooth
		Freq	Output signal frequecy	Squar(10Hz-1Mhz)sine/ triangle/sawtooth(10Hz-20kHz)
		Duty	Output signal duty cycle	10%-90%
	System Setting	Volume	Adjust buzzer volume	0%-90%
		Blight	Adjust backlight brightness	10%-100%
		Standby	Adjust standby time	0min-60min

Functional Overview

Specific Parameter Intro

Dial up/down Wheel M to choose options in option menu, middle click Wheel M to open option setting menu; dial left/right Wheel S to choose parameters and change current values.

Menu	Options	Functions	Annotation for Functions	Description
Page3 Setting Page3 Options	System Setting	PowerOff	Auto power off time	0min-60min
		MenuCycle	Main Menu option cycle	ON/OFF
		ItemCycle	Sub-menu option cycle	ON/OFF
		PostSlide	Ripid Slide post	ON/OFF
	Calibration	Calibrate Zero	Middle click Wheel S, an auto calibration window will pop up, middle click Wheel S to auto calibrate; after auto calibration, save calibration data in the pop-up window	
		Restore Data	Middle click Wheel S, a restore factory setting window will pop up, then middle click Wheel S to restore factory settings	
	Product Info	DeviceSN	device serial number	
		Hardware	Hardware version number	
		MCU Typy	Processor type	
		LCD Typy	LCD screen mode	
		USB Disk	U Disk capacity	
		DFU Typy	DFU version	
		APP Typy	APP version	
	About	Relevant ancillary information		

Product Inspection

Charge and monitor the battery

- When the battery voltage status turns to "" or display brightness is relatively dim, please charge the battery in time. Charging is available in both power-on and off mode. When the battery is being charged, the LED will light on until the charging process is finished.

- Under any circumstances, switching power button to OFF can turn off DS212.

General Inspection

- When you get a new DS212 oscilloscope, you are advised to inspect the product by the following steps.
- Inspect damages caused by shipping.
  If the packaging carton or the protection pad is seriously damaged, keep the package until the oscilloscope & accessories pass the electrical and the mechanical test.
- Inspect the product.
  Please contact the company if the following problems occur:
  1) product surface is damaged,
  2) product doesn't work properly,
  3) product does not pass performance test.
  If the damage is resulted from shipping, please keep the package and contact the company for repair or exchange.

Chapter 6

Battery Disposal

Regulatory Markings

FCC compliance statement

This device is complied with the regulation in the 15th part of FCC regulation. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference,and
(2) This device must accept any interference received, including the interference that may cause undesired operation.

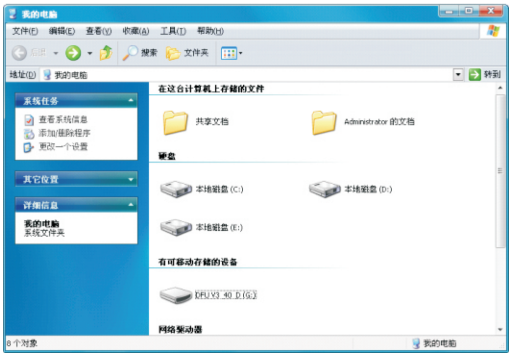
The CE mark is a registered trademark of European Community. This CE mark shows that the product complies with all the relevant European Legal Directives.

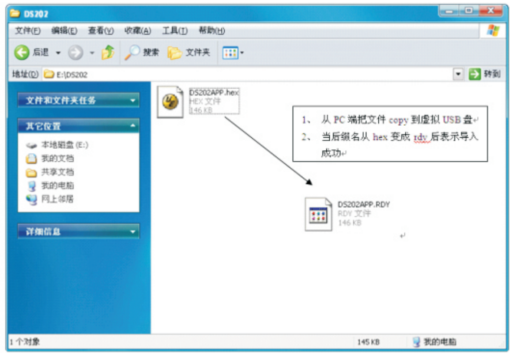
Do not dispose in domestice household waste

- This device complies with the WEEE Directive (2002/96/EC) marking requirement. This affixed product label indicates that you must not discard this electrical or electronic product in domestic household waste.
- Disposal and recycling: you must dispose the mini oscilloscope according to local law and regulations. As the oscilloscope contains electronic building brick and battery, you must dispose it respectively with garbage.
- Please dispose the battery in accordance with local environmental regulations.

Technical Support

Firmware upgrading





To upgrade the firmware of oscilloscope, please carry out the operation below：

1.Open web browser to visit www.minidso.com , download the newest firmware appropriate to oscilloscope to your PC.

2.Hold Pause button and turn on DS212, to enter DFU mode for upgrade.

3.Use USB data cord to connect DS212 to your PC, and a removable hard disk named “DFU V3_40_D” will appear on your PC. Copy the hex firmware to the root directory of that disk. After the extension of the firmware changes from “hex” to “rdy”, restart DS212. Then the upgrading process is finished.

For more information, please visit www.minidso.com.